

WEEKLY CALENDAR

August 31, 2009

Departmental Colloquium

"Interacting, Double White-Dwarf Binary Star Systems"

3:40 PM, September 3, 2009
109 Nicholson Hall

Joel E. Tohline

Louisiana State University – Physics and Astronomy

Host: Juhan Frank

• *Refreshments served at 3:15 PM in 232 (Library) Nicholson Hall* •

Like the Sun, most stars will end their lives as a white dwarf -- a compact star ($M \sim 1$ solar mass, but $R \sim 1$ Earth radius) supported against further gravitational collapse by the pressure of a "zero temperature" Fermi gas. More interestingly, most binary stars are expected to end their lives as double white-dwarf (DWD) binary systems. Over time, the orbit of each DWD system will slowly decay, due to the loss of angular momentum via gravitational radiation. When the orbital separation is small enough, mass can be tidally stripped from one star and transferred via an accretion stream to the companion. We will show results from recent computational fluid dynamic calculations that have been designed to simulate this type of interacting DWD binaries. These simulations are helping to clarify under what conditions a DWD system can enter a long-lived phase of stable mass transfer (producing what astronomers refer to as an AM CVn binary) or will undergo a catastrophic merger (producing an R Coronae Borealis star or a Type Ia supernova explosion).

Publications:

- "Spin-Orbit Scattering and Quantum Metallicity in Ultra-Thin Be Films", Y.M. Xiong, **A.B. Karki, D.P. Young**, and **P. W. Adams**, Phys. Rev. B 79, 020510 (2009).(RC).
- "The Pairing Resonance as a Normal-State Spin Probe in Ultra-Thin Superconducting Al Films", G. Catelani, **Y.M. Xiong**, X.S. Wu, and **P.W. Adams**, Phys. Rev B 80, 054512 (2009). (Editor's Suggestion).
- "Measurement of Conduction Electron Polarization Via the Pairing Resonance", **Y.M. Xiong, P.W. Adams**, and G. Catelani, Phys. Rev. Lett. 103, 067009 (2009).
- "Binary Black Holes' Effects on Electromagnetic Fields," Carlos Palenzuela, **Matthew Anderson, Luis Lehner**, Steven L. Liebling, and David Neilsen, Phys. Rev. Letter, V103, 081101, (2009).